

Claims

- 1 *Sub* 1. A method for protecting a plant against an environmental stress,
2 said method comprising the steps of:
- 3 (a) producing a transgenic plant cell comprising a recombinant protein
4 kinase (PK) domain-containing gene integrated into the genome of said transgenic
5 plant cell and positioned for expression in said transgenic plant cell, said PK
6 domain-containing gene being capable of increasing the level of tolerance to an
7 environmental stress; and
- 8 (b) growing a transgenic plant from said plant cell, wherein said PK
9 domain-containing gene is expressed in said transgenic plant.
- 1 2. The method of claim 1, wherein said environmental stress is
2 dehydration.
- 1 3. The method of claim 1, wherein said environmental stress is excess
2 salinity.
- 1 4. The method of claim 1, wherein said environmental stress is a
2 temperature stress.
- 1 5. The method of claim 1, wherein said plant is protected against
2 multiple stress conditions.

1 12. The method of claim 8, wherein said plant is protected against
2 multiple stress conditions.

1 13. The method of claim 8, wherein the expression of said CDPK
2 gene activates the expression of a stress-protective protein.

1 14. The method of claim 8, wherein said CDPK gene is constitutively
2 expressed in said transgenic plant.

1 15. A method for protecting a plant against an environmental stress,
2 said method comprising the steps of:

3 (a) producing a transgenic plant cell comprising a recombinant CaM-K
4 gene integrated into the genome of said transgenic plant cell and positioned for
5 expression in said transgenic plant cell, said calcium/calmodulin-dependent protein
6 kinase (CaM-K) gene being capable of increasing the level of tolerance to an
7 environmental stress; and

8 (b) growing a transgenic plant from said plant cell, wherein said CaM-K
9 gene is expressed in said transgenic plant.

1 16. The method of claim 15, wherein said CaM-K gene comprises a
2 mammalian CaM-K gene.

1 17. The method of claim 15, wherein said environmental stress is
2 dehydration.

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1 18. The method of claim 15, wherein said environmental stress is
2 excess salinity.

1 19. The method of claim 15, wherein said environmental stress is a
2 temperature stress.

1 20. The method of claim 15, wherein said plant is protected against
2 multiple stress conditions.

1 21. The method of claim 15, wherein the expression of said CaM-K
2 gene activates the expression of a stress-protective protein.

1 22. The method of claim 15, wherein said CaM-K gene is
2 constitutively expressed in said transgenic plant.

1 23. A method for protecting a plant against an environmental stress,
2 said method comprising the steps of:

3 (a) producing a transgenic plant cell comprising a combination of at
4 least two genes selected from the group consisting of a recombinant PK domain
5 gene, a recombinant CDPK gene, and a CaM-K gene, each of said genes being
6 capable of increasing the level of tolerance to an environmental stress, each of said
7 genes being integrated into the genome of said transgenic plant cell and positioned
8 for expression in said transgenic plant cell; and

9 (b) growing a transgenic plant from said plant cell, wherein a
10 combination of at least two of said genes is expressed in said transgenic plant.

1 *Sub*
2 *13* 24. A transgenic plant comprising a recombinant PK domain gene
3 integrated into the genome of the transgenic plant and positioned for expression in
4 the plant, wherein said PK domain gene is capable of increasing the level of
tolerance, on a plant expressing said PK domain gene, to an environmental stress.

1 25. A seed from a transgenic plant of claim 24.

1 26. A cell from a transgenic plant of claim 24.

1 27. A transgenic plant comprising a recombinant CDPK gene
2 integrated into the genome of the transgenic plant and positioned for expression in
3 the plant, wherein said CDPK gene is capable of increasing the level of tolerance,
4 on a plant expressing said CDPK gene, to an environmental stress.

1 28. A seed from a transgenic plant of claim 27.

1 29. A cell from a transgenic plant of claim 27.

1 30. A transgenic plant comprising a recombinant CaM-K gene
2 integrated into the genome of the transgenic plant and positioned for expression in
3 the plant, wherein said CaM-K gene is capable of increasing the level of tolerance,
4 on a plant expressing said CaM-K gene, to an environmental stress.

1 31. A seed from a transgenic plant of claim 30.

1 32. A cell from a transgenic plant of claim 31.

33. A transgenic plant comprising a recombinant CDPK gene, PK domain gene, CaM-K gene, or any combination thereof integrated into the genome of the transgenic plant cell and positioned for expression in said plant cell, the CDPK, PK domain, and CaM-K genes being capable of increasing the level of tolerance to an environmental stress, wherein said DNA is expressed in said transgenic plant.

1 34. A seed from a transgenic plant of claim 34.

1 35. A cell from a transgenic plant of claim 34.

1 ~~24~~ 36. Substantially pure DNA encoding a PK domain polypeptide, said
2 polypeptide being capable of increasing the level of tolerance to an environmental
3 stress in a transgenic plant.

1 37. The DNA of claim 36, wherein said DNA encodes a polypeptide
2 which confers tolerance to dehydration.

1 38. The DNA of claim 36, wherein said DNA encodes a polypeptide
2 which confers tolerance to salinity.

1 39. The DNA of claim 36, wherein said DNA encodes a polypeptide
2 which confers tolerance to a temperature stress.

1 48. The polypeptide of claim 47, wherein said polypeptide comprises
2 an amino acid sequence substantially identical to the amino acid sequence shown
3 in Fig. 5 (SEQ ID NO: 2).

ADD 4

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